



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,283	04/14/2004	Ching-Pang Lee	146806	6202

7590 08/07/2006  
John S. Beulick  
Armstrong Teasdale LLP  
Suite 2600  
One Metropolitan Square  
St. Louis, MO 63102

EXAMINER

WIEHE, NATHANIEL EDWARD

ART UNIT	PAPER NUMBER
----------	--------------

3745

DATE MAILED: 08/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

28

<b>Office Action Summary</b>	<b>Application No.</b> 10/824,283	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> Nathan Wiehe	<b>Art Unit</b> 3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 June 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-7 and 9-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14-20 is/are allowed.
- 6) ☒ Claim(s) 1,3-7 and 9-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments, see page 11, filed 01 June 2006, with respect to claim 14 have been fully considered and are persuasive. The rejection of claims 14-20 has been withdrawn.

Applicant's arguments filed 01 June 2006 have been fully considered but they are not persuasive. Applicant argues that there is no teaching or suggestion to support the combination of Winstanley and Corsmeier and that the different cooling flow arrangements teach away from the combination. However, Corsmeier clearly suggests that the distinct cooling circuits disposed adjacent to the sides of the airfoil provides efficient localized cooling of the extremely hot concave and relatively cooling convex sides of the airfoils (Corsmeier column 2, lines 51-54). Although Winstanley and Corsmeier teach the use of different kinds of cooling circuits the essential teaching of Corsmeier is the use of distinct cooling circuits along the sides of the airfoil allowing for differential cooling to compensate for the different thermal loading of the sides. Therefore, it would have been obvious to one of ordinary skill in the art to modify the blade of Winstanley by using cooling circuits extending adjacent the sides as taught by Corsmeier in order to provide efficient localized cooling of the airfoil sides, while maintaining the cooling circuit configuration of Winstanley.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3-7 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winstanley (5,246,340) in view of Corsmeier (5,813,835).

Winstanley discloses an airfoil (14), used in a gas turbine engine (10), including a first sidewall (22) and second sidewall (24) coupled together at leading edge (18) and trailing edge (20), which defines an internal cavity. Winstanley's airfoil also includes rib walls (40,42,44), which define a cooling circuit in which cooling fluid travels from a feed chamber (56) to a transition chamber (58) and then to an ejection chamber (60-66).

The chambers of Winstanley's airfoil are joined in flow communication with each other by openings (43,45) in said rib walls. Winstanley's airfoil also includes a plurality of film cooling holes (70) in sidewall (22) extending into cooling chamber (60-66) and trailing edge slots (72) extending into cooling chamber (60-66). Winstanley's airfoil further includes a leading edge circuit including a feed chamber (54) and a cooling chamber (52) in flow communication with each other by a plurality of openings (39). Winstanley does not disclose the use of pressure and suction side circuits or a purge chamber.

Corsmeier discloses a cooled gas turbine airfoil (16), which includes a pressure side and suction side cooling circuit (22,24). Also, Corsmeier discloses the use of purge chambers (26) provided with exhausted cooling air that has already been warmed

Art Unit: 3745

through other cooling processes. The presence of pressure and suction sidewall cooling circuits as well as purge chambers provides for efficient localized cooling and a favorable temperature gradient throughout the blade (Corsmeier column 2, line 48-column 3, line 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the airfoil of Winstanley by locating cooling circuits on the pressure and suction sides and including purge chambers, as taught by Corsmeier in order to compensate for the differential heat loading on the two sides of the airfoil providing a blade with a favorable thermal gradient throughout.

In regard to claims 1, and 3-6 the method of fabrication would have been apparent from modified invention of Winstanley.

In regard to claim 13, Applicant has not defined the cooling of the purge chamber above the fact that heat is transferred out of the walls by the flow in the adjacent cooling circuits. Specifically, Applicant has not established the purge chamber as being devoid of cooling air or only provided with cooling air other than the primary air provided to the cooling circuits. Therefor, the purge chamber of Corsmeier meets the claim limitation in so much as it provided with secondary exhausted cooling air and not the primary flow of cooling circuit air. Additionally, the heat transfer caused by the cooling fluid is inherent from the material properties of the blade. Further, Corsmeier discusses the need to prevent overcooling of the purge chamber.

***Allowable Subject Matter***

Claims 14-20 are allowed.

Art Unit: 3745

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Wiehe whose telephone number is (571)272-8648. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571)272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Nathan Wiehe  
Examiner  
Art Unit 3745



EDWARD K. LOOK  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700

7/28/00